Contents

Preface vii

Conference organization ix

Supporting organizations and sponsors x

SPECTROSCOPIC ELLIPSOMETRY

In situ spectroscopic ellipsometry in molecular beam epitaxy for photonic devices
G.N. Maracas, J.L. Edwards, D.S. Gerber and R. Droopad 1

In situ spectral ellipsometry for real-time measurement and control
W.M. Duncan and S.A. Henck 9

In situ spectroscopic ellipsometry studies of electron cyclotron resonance (ECR) plasma etching of oxides of silicon and GaAs
N.J. Ianno, S. Nafis, P.G. Snyder, B. Johs and J.A. Woollam 17

Spectroscopic ellipsometry characterisation of light-emitting porous silicon structures
C. Pickering, L.T. Canham and D. Brumhead 22

In situ studies of semiconductor processes by spectroellipsometry
B. Drévillon 27

Growth mode of ultrathin Sb layers on Si studied by spectroscopic ellipsometry and Raman scattering
U. Rossow, U. Frotscher, N. Esser, U. Resch, Th. Müller, W. Richter, D.A. Woolf and R.H. Williams 35

Criteria for the extraction of SIMOX material parameters from spectroscopic ellipsometry data
S. Lynch, G.M. Crean, R. Greef and J. Stoemonos 40

Round robin investigation of silicon oxide on silicon reference materials for ellipsometry
J. Vanhellemont, H.E. Maes, M. Schaekers, A. Armigliato, H. Cerva, A. Cullis, J. de Sande, H. Dinges, J. Hallais, V. Nayar, C. Pickering, J.-L. Stehlé, J. Van Landuyt, C. Walker, H. Werner and P. Salieri 45

Spectroscopic ellipsometric characterization of $Si/Si_{1-x}Ge_x$ strained-layer supperlattices
H. Yao, J.A. Woollam, P.J. Wang, M.J. Tejwani and S.A. Alterovitz 52

The influence of nanocrystals on the dielectric function of porous silicon
H. Münder, M.G. Berger, H. Lüth, U. Rossow, U. Frotscher, W. Richter, R. Herino and M. Ligeon 57

SECONDARY ION MASS SPECTROSCOPY

Some examples of depth resolution in SIMS analysis
G. Prudon 62

Process control for III–V semiconductor device fabrication using mass spectroscopy
A.P. Webb 70

Sputter induced resonant ionization spectroscopy for trace analysis in silicon
L. Johann, R. Stuck, Ph. Kern, B. Sipp and P. Siffert 75

CONTAMINATION MONITORING

Contamination control and ultrasensitive chemical analysis
H. Ryssel, L. Frey, N. Streckfuss, R. Schork, F. Kroninger and T. Falter 79

Organic contamination of silicon wafers by buffered oxide etching
M. Beyer, K. Budde and W. Holzapfel 88

Application of advanced contamination analysis for qualification of wafer handling systems and chucks
F. Kroninger, N. Streckfuss, L. Frey, T. Falter, C. Ryzlewicz, L. Pfitzner and H. Ryssel 93

EPIOPTIC CHARACTERIZATION TECHNIQUES

In situ optical spectroscopy of surfaces and interfaces with submonolayer resolution
J.F. McGilp 99

Thermal desorption of amorphous arsenic caps from GaAs(100) monitored by reflection anisotropy spectroscopy
U. Resch, S.M. Scholz, U. Rossow, A.B. Müller, W. Richter and A. Förster 106

Optical second harmonic generation from the Si(111)–Sb interface
J.R. Power and J.F. McGilp 111

Surface-sensitive multiple internal reflection spectroscopy as a tool to study surface mechanisms in CVD: the example of UV photodeposition of silicon dioxide and silicon nitride
C. Licoppe and C. Debauche 115

CHARACTERIZATION OF THE MECHANICAL STATE OF Si MATERIAL SYSTEM

On the assessment of local stress distributions in integrated circuits
J. Vanhellemont, I. De Wolf, K.G.F. Janssens, S. Frabboni, R. Balboni and A. Armigliato 119

Strain analysis of multilayered silicon-based contact structures
E. Zolotoyabko, A. Ashkenazi and Y. Komem 126

JOINT SESSION ON SINGLE CHAMBER PROCESSING

In-process control of silicide formation during rapid thermal processing
J.-M. Dilhac, C. Ganibal, N. Nolhier, P.B. Moynagh, C.P. Chew and P.J. Rosser 131

In situ ellipsometry for real-time feedback control of oxidation furnaces
C. Schneider, R. Berger, L. Pfitzner and H. Ryssel 135

PHOTOREFLECTANCE OF III–V MATERIALS

Optical characterization of the electrical properties of processed GaAs
O.J. Glembocki, J.A. Dagata, E.S. Snow and D.S. Katzer 143

Optical study of band bending and interface recombination at Sb, S and Se covered gallium arsenide surfaces
S. Hildebrandt, J. Schreiber, W. Kircher and R. Kuzmenko 153

Photoreflectance investigation of dry-etch-induced damage in semi-insulating GaAs substrates
M. Murtagh, P.V. Kelly, P.A.F. Herbert, M. O'Connor, G. Duffy and G.M. Crean 158

Contactless electromodulation for in-situ characterization of semiconductor processing
X. Yin, X. Guo, F.H. Pollak, G.D. Pettit, D.T. McInturff, J.M. Woodall and E.-H. Cirlin 163

Photoreflectance versus ellipsometry investigation of $GaAs/Al_{0.3}Ga_{0.7}As$ MQW's
V. Bellani, A. Borghesi, M. Geddo, G. Guizzetti, A. Stella and Chen Chen-Jia 167

Temperature dependence of the photoreflectance of strained and lattice-matched InGaAs/InAlAs single quantum wells
Y. Baltagi, S. Monéger, A. Tabata, T. Benyattou, C. Bru, A. Georgakilas, K. Zekentes and G. Halkias 172

PHOTOLUMINESCENCE OF PHOTONIC MATERIAL SYSTEMS

Optical tools for intermixing diagnostic: application to InGaAs/InGaAsP microstructures
H. Peyre, F. Alsina, S. Juillaguet, E. Massone, J. Camassel, J. Pascual and R.W. Glew 177

Characterization of lattice-matched and strained GaInAs/AlInAs HEMT structures by photoluminescence spectroscopy
A. Tabata, T. Benyattou, G. Guillot, A. Georgakilas, K. Zekentes and G. Halkias 182

Interface characterization of strained InGaAs/InP quantum wells after a growth interruption sequence
R. Schwedler, B. Gallmann, K. Wolter, A. Kohl, K. Leo, H. Kurz, S. Juillaguet, E. Massone, J. Camassel, J.P. Laurenti and F.H. Baumann 187

Electric field dependence of allowed and forbidden transitions in $In_{0.53}Ga_{0.47}As/In_{0.52}Al_{0.48}As$ single quantum wells by room temperature modulation spectroscopy
A. Dimoulas, J. Leng, K.P. Giapis, A. Georgakilas, G. Halkias and A. Christou 191

Optical characterization of InP/InAlAs/InP interfaces grown by MOVPE
T. Benyattou, M.A. Garcia, S. Monéger, A. Tabata, M. Sacilotti, P. Abraham, Y. Monteil and R. Landers 197

Temperature dependence analysis of the optical transmission spectra in InGaAs/InP multi quantum well structures
C. Arena, L. Tarricone, F. Genova and G. Morello 202

CHARACTERIZATION OF ELECTRONIC PROPERTIES

Lifetime and diffusion length inhomogeneity controlled by point and extended defect interaction in n-GaAs LEC
A. Castaldini, A. Cavallini, E. Gombia, R. Mosca, L. Tarricone, A. Motta and L. Bora 208

Mapping of the local minority carrier diffusion length in silicon wafers
M. Stemmer 213

Evaluation of the minority carrier lifetime and diffusion coefficient of cast polycrystalline silicon wafers by the dual mercury probe method
E. Suzuki and Y. Hayashi 218

In-situ quality monitoring during the deposition of a-Si:H films
C. Haffer, M. Kunst, C. Swiatkowski and G. Seidelmann 222

FTIR AND PL OF SILICON MATERIAL SYSTEMS

Non-destructive identification of end-of-range damage in ion-implanted and annealed silicon
Yu. Shreter, J.H. Evans, B. Hamilton, A.R. Peaker, C. Hill, D.R. Boys, C.D. Meekison and G.R. Booker 227

Correlation of photoluminescence and nuclear characterization of In-implanted silicon
M.O. Henry, T.B. Kehoe, M.H. Nazare, K. Freitag and R. Vianden 232

Accurate infrared spectroscopy analysis in back-side damaged silicon wafers
B. Garrido, J.A. Moreno, J. Samitier and J.R. Morante 236

Chemical composition of porous silicon layers studied by IR spectroscopy
W. Theiss, P. Grosse, H. Münder, H. Lüth, R. Herino and M. Ligeon 240

Stoichiometry of oxygen precipitates in silicon
B. Pivac, A. Borghesi, M. Geddo, A. Sassella and A. Stella 245

Optical characterization of semiconductors containing inhomogeneous layers
G.E. Aizenberg, P.L. Swart and B.M. Lacquet 249

POSTERS

Nonlinear recombinations in photoreflectance characterization of silicon wafers
B.C. Forget, D. Fournier and V.E. Gusev 255

Investigation of the relaxation of excess carriers in SiGe-heterostructures by photothermal measurement
H.D. Geiler, S. Krügel, J. Nützel, E. Friess and G. Abstreiter 260

Epioptic analysis of the initial ordered growth of Au on Si(111)
J.D. O'Mahony, J.F. McGilp, M.H.W. Verbruggen and C.F.J. Flipse 266

Diagnostics of the silicon–insulator interface structure by optical second-harmonic generation
I.V. Kravetsky, L.L. Kulyuk, A.V. Micu, D.A. Shutov, E.E. Strumban, C. Cobianu and D. Dascalu 269

Atomic scale simulation of crystal growth applied to the calculation of the photoemission current
M. Djafari Rouhani, N. Fazouan, A.M. Gue and D. Esteve 273

Potential step imaging of interfaces in MBE-grown structures
B. Hugsted, J. Gjønnes and J. Taftø 277

Using the metal–oxide–polysilicon–silicon (MOPS) structure to determine LPCVD polysilicon quality
J.C. Carter, A.G.R. Evans and K. Throngnumchai 281

Combined low-frequency noise and random telegraph signal analysis of silicon MOSFET's
E. Simoen, U. Magnusson and C. Claeys 285

Effect of near-surface damage on C–V measurements of Schottky barrier diodes
D. Bauza 291

The impact of high-field stressing on C–V characteristics of irradiated gate oxides
T. Brožek and B. Pešić 295

Effects of diffusion-induced defects on the carrier lifetime
A. Castaldini, A. Cavallini, B. Fraboni and E. Giannotte 301

In situ bulk lifetime measurement on silicon with a chemically passivated surface
T.S. Horányi, T. Pavelka and P. Tüttö 306

Infrared analysis of buried insulator layers formed by ion implantation into silicon
J. Samitier, S. Martinez, A. El Hassani, A. Pérez-Rodríguez and J.R. Morante 312

Electrochemical etching and profiling of silicon
T.S. Horányi and P. Tüttö 316

Author index 322

Subject index 327